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AUTHOR Speidel, Gisela E.
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ABSTRACT

Sixteen kindergarten children were instructed in grapheme-phoneme correspondences according to two methods that were identical except that in one method the children were instructed individually and in the other the children received group instruction. The number of learning trials given to each child was the same in both situations. However, in the group the teacher showed all of the children the consonant card before calling on an individual child to identify it. Since there were nine other children in the group, each child had 45 potential vicarious learning trials. The results of the experiment indicated that the children in the group performed better than those who received individual training. Furthermore, children in the group learned significantly more grapheme-phoneme correspondences from trial one to trial two, but later trials indicated no difference in the learning rate between the two groups. It was concluded that learning trials given to other group members can function as effective vicaricus trials. (Author/MAI)

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A Comparison of the Effects of Group Training and Individual Training on the Acquisition of Consonant Sounds

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Gisela E. Speidel

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Ronald Gallimore, Roland G. Tharp & Gisela E. Speidel,
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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Technical Report #47

A Comparison of the Effects of Group Training and Individual Training on the Acquisition of Consonant Sounds

Gisela E. Speidel*

A teacher can use many different formats of instructing her students, ranging from teaching the whole class together to working with a child individually. Generally, she will use a combination of these extremes based on her judgment of the most effective use of her time. Currently there is a trend toward individual instruction rather than large group instruction. The popularity of individualized instruction is based on the assumption that children are at different stages of learning and have different needs, and therefore benefit little from large group instruction. The logic behind group instruction is that the participating children will learn from the teachers' instruction to the group, as well as from the practice trials given to some of the children.

There is a substantial body of data on observational learning which indicates that children do learn affective, motor, and social behavior (Bandura, 1969; 1971) as well as complex cognitive behaviors (Zimmerman and Rosenthal, 1974) from observing other children or adults. The present study investigated whether such observational learning would come about in regular classroom group instruction sessions in which the child is an actively participating member of the group to whom the vicarious learning trials are administered. This situation contrasts with the typical experimental investigation of vicarious trials in which the subject passively observes the model through a one way mirror or on

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*Mele Ah Ho's assistance is gratefully acknowledged.

a video tape before being asked to perform the task.

Specifically, this study compared the effectiveness of learning trials given to children individually with those given to children in a group in which there were potentially additional learning trials in the form of trials given to other group members. The task was learning the sounds of various consonants. An attempt was made to keep the group condition as similar as possible to a typical group instruction session, so that the results could be applied to regular classroom instruction.

Method

Subjects

Sixteen kindergarten children participated in the experiment proper. Two additional children were included as fillers for the group training conditions, but their scores were not included in any analyses.

The children were matched in pairs on the basis of scores obtained on an index derived from averaging IQ and test knowledge of the letter sounds to be learned.

Design

The design was a three-factor repeated measures design with two within subject variables (trials and training conditions) and one between subject variable (order of training conditions). One child from each pair was randomly assigned to Group 1 which was first given the individual training condition and then during the second phase the group training. The other child of the pair was assigned to Group 2 which was first given group training then individual training.

Materials

Two decks of cards were used containing five letters each. The letters were

printed in black ink 3" tall and 2" wide on white 5"x8" index cards. Deck 1 which was used for the first phase consisted of five cards with the lower case letters w, c, t, m, and b. Deck 2, used for the second phase, consisted of the letters n, p, s, v, and l. A record sheet was prepared for each child.

Procedure

Group training condition. Ten children were seated at tables arranged in a semi-circle around the teacher. The first session began with a study trial. A teacher held up each of the five letters one at a time saying, "This is ___".

Ten sets of either Deck 1 or 2 (depending upon phases) were in front of the teacher. The five letters in each set were randomly arranged. Each set of letters carried the name of one of the children in the group.

This system of individualized sets of cards insured that each child received one and only one trial on each of the five letters during a single session. For each trial, the teacher chose a card randomly among the decks that appeared unmarked to the children. She showed the card for approximately five seconds to the whole group before calling upon the child from whose deck the card was drawn to respond. This procedure was to provide the children, who had no way of knowing whether they would be called upon, with an opportunity to subvocally produce the sound of the letter at each trial. Since there were nine other children in the group, a child had 45 potential vicarious learning trials, that is nine trials on each of the five letters. Whether a child was actually responding to the vicarious trials was not monitored on account of technical difficulties.

After showing the card to the group, the teacher would call on the child from whose set she had chosen the card. If the child responded with the appropriate letter sound, the teacher would say, "Yes, that is ___". If the child responded incorrectly, she would say, "No, that's ___". A card was held up

up for an average of 10 seconds. If the child did not respond within that period, the teacher would say "That's ___". After each child's trial, she would note on the card whether the child had gotten the letter sound correct, incorrect, or omitted responding.

The teacher continued to select letter cards from the sets and conduct learning trials in the manner just described until all cards in each set had been used, that is, until she had given 10 trials on each of the five letters to the group. The sessions lasted approximately 10 minutes and were conducted daily until each child had received 10 days of training.

Individual training condition. In the individual training condition the teacher worked individually with each child for approximately one minute each day in a room immediately adjacent to the classroom. The very first session was preceded by a study trial in which the teacher held up one letter at a time while saying the sound of the letter. She then proceeded to hold up each card for approximately 10 seconds. If the child produced the correct sound, she would say, "Yes, that's ___"; if the child produced the incorrect sound she would say, "No, that's ___"; and if the child did not respond she would say, "That's ___". The child returned to the classroom as soon as he had received one presentation of each of the five letters to be learned. Each child was trained to a criterion of two consecutive trials correct on each of the five letters or until 10 sessions had been concluded, whichever came first.

Results

The number of letter sounds given correctly was recorded for each child on each trial, a trial being defined as one presentation of each of the five letters. Only the first four trials were used for data analysis because after the fourth trial a number of children in the individual training group

reached criterion (i.e. two consecutive trials correct) and training was discontinued for them.

The number of letter sounds produced accurately over the four trials were analyzed by means of a three-factor analysis of variance with one between subject factor (order of training conditions) and two within subject factors (training conditions and trials). (See Table 1 for the summary of the analysis of variance.) The training conditions showed a significant main effect, with the group condition being superior to the individual condition (F (1, 12)=50.89, $p < .01$). Figure 1 shows the mean number of letters correct on each of the first four trials for the group and the individual training conditions during Phase 1 and Phase 2.

However, the conclusion that the children exhibited higher performance under the group training condition than under the individualized training condition must be qualified, since order of administration interacted significantly with training condition (F (1,12) = 20.41, $p < .01$). Newman-Keuls comparisons of the mean number of sounds correct/trial showed that group training was significantly better than individual training for Group 1, but not for Group 2 (see Table 2 and Figure 2). Group 1 had received individual training first and group training second, while Group 2 had received the two training conditions in the reverse order.

The lack of a significant effect for group training in Group 2, may be attributable to the presence of a learning-to-learn phenomenon from Phase 1 to Phase 2. This explanation is based on the following findings: a) The children, regardless of training condition performed significantly better in Phase 2 than in Phase 1; (t related (12)=2.05; $p < .05$) and b) If order of administration is held constant, then the performance during group training condition is consistently higher than during the individual training condition (see Figure 3).

Table 1

Summary of the analysis of variance for number of letter sounds correct on the first four trials for Groups 1 and 2 under group or individual training conditions during Phases 1 and 2.

SV	df	SS	MS	F	
Total	111	317			
Between S	13	85			
A (order)	1	3.57	3.57	.52	ns
S/A	12	82.03	6.83		
Within S	98	232.25			
B (condition)	1	85.75	85.75	50.99**	
AB (order x cond)	1	34.32	34.32	20.41**	
SB/A	12	20.17	1.68		
C (trials)	3	31.78	10.59	14.85**	
AC (order x trials)	3	3.78	1.26	1.76	
SC/A	36	25.67	.71		
BC (cond x trials)	3	4.74	1.58	2.23	ns
ABC	3	.46	.15	.21	
SBC/A	36	25.53	.70		

**$p < .01$

Significant learning occurred over the first four trials (F (3, 36)=14.85, $p < .01$) in both training conditions. However, there was no significant interaction between speed of learning over the four sessions and training condition. That is, although group training resulted in overall higher performance, it did not produce faster learning than individual training. Inspection of Figure 1 suggests though, that the group condition learned at a more rapid rate than the individual condition from Trial 1 to Trial 2. A three-factor mixed

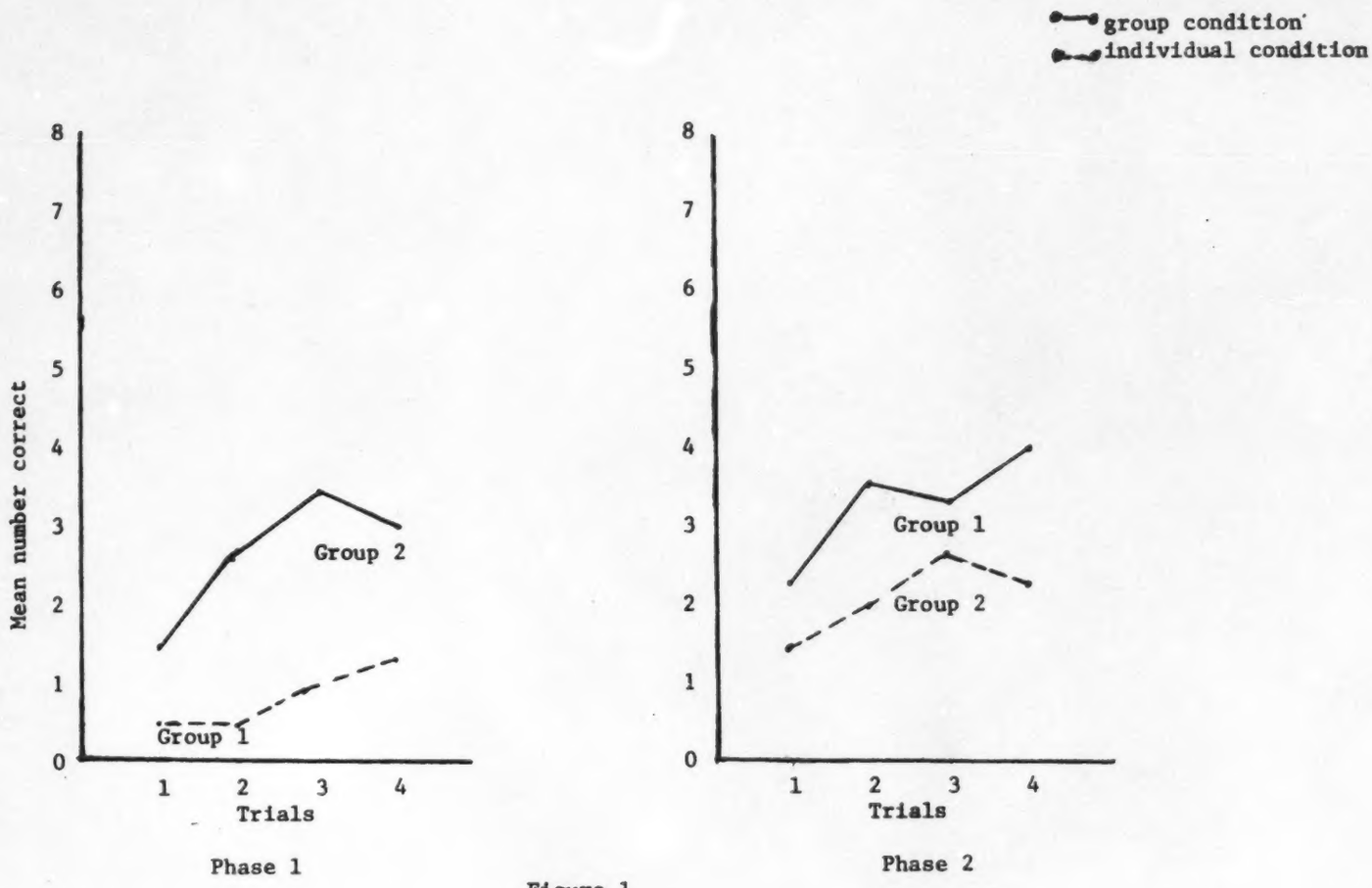

Figure 1

Mean number of responses correct per trial for Groups 1 and 2 under group and under individual training conditions during Phase 1 and 2.

Figure 2

Mean number of letters correct per trial for Group 1 and Group 2 under individual and group training conditions.

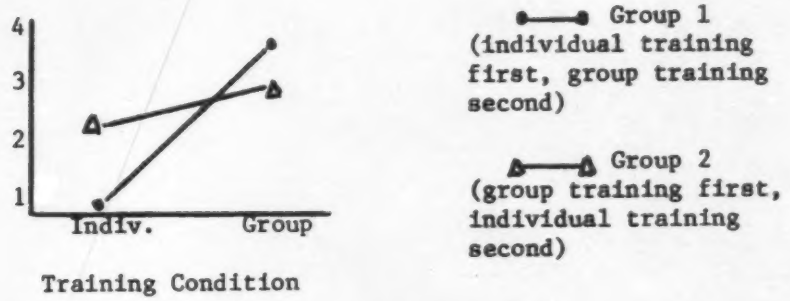

Figure 3

Mean number of letters correct per trial under group training and individual training conditions when they are administered first or second in the training sequence

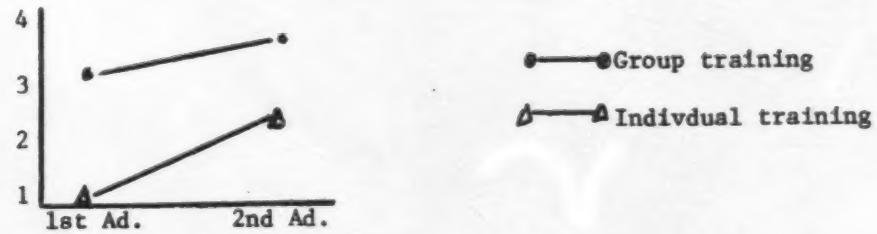

Table 2

Mean number of correct sounds/trial over the first four trials for Groups 1 and 2 during Phases 1 and 2.

Group	Order of Administration	Training Condition	
		Individual	Group
Group 1	Individual Condition First	.93	3.79
Group 2	Group Condition First	2.39	3.04

*$p < .05$ (Newman-Keuls)

analysis of variance was therefore conducted on the number of letter sounds correct for the first two trials only. Again, the within factors were training conditions and learning trials, while order of training condition was the between factor. The results (see Table 3) were very similar to the previous analysis on all four learning trials, with one exception. The training condition by trial interaction (F (1, 12)=5.31, $p < .05$) was significant indicating that group condition did learn more rapidly from the first to the second trial.

Table 3

Summary of the analysis of variance of number of letter sounds correct on the first two trials for Groups 1 and 2 under group or individual training conditions in Phases 1 and 2.

SV	df	SS	MS	F
Total	55	140		
Between S	13	33		
A (order)	1	.87	.87	.31
S/A	12	32.92	2.74	
Within S	42	106.75		
B (condition)	1	36.16	36.16	31.80*
AB (order x condition)	1	19.44	19.44	17.10*
SB/A	12	13.64	1.13	
C (trials)	1	9.44	9.44	7.89*
AC (order trials)	1	.44	.44	.37
SC/A	12	14.35	1.19	
BC (condition trials)	1	4.01	4.01	5.31**
ABC (condition trials order)	1	.16	.16	0.21
SBC/A	12	9.07	.75	

*$p < .01$
**$p < .05$

Discussion

The findings of the present study indicate that the group condition performed significantly better over the first four training sessions than the individual condition with the exception of one of the comparisons involving Group 2. Group 2 showed only a tendency toward better performance under the group training condition. The lack of significant findings in this

particular comparison can probably be attributed to the effects of learning-to-learn: Since Group 2 was first given the group training condition and then the individual training, performance under the latter condition was spuriously enhanced by the previous experience.

Although the group condition was superior to the individual condition in general, this does not necessarily mean that the students in the group condition learned faster, nor that they learned from the trials given to the other children in the group. To determine different learning rates between the two conditions, one must examine the interaction effect between training conditions and trials. The analysis of this interaction shows that children in the group condition did learn significantly faster than in the individual condition on the first two trials, but not on any of the later trials. This finding suggests that the children learned from vicarious trials in the group condition, even though this learning was restricted to early trials. Possibly the lack of any effect due to the vicarious trials on later trials was an artifact resulting from a ceiling effect on learning in the group condition.

Additional evidence for the effects of the vicarious trials might be reflected in the consistently higher performance under the group training condition on Trial 1. This finding is somewhat ambiguous. It may simply mean that participation in the group functioned as a priming stimulus facilitating attention. The preferred explanation is that the superior performance in the group condition on Trial 1 reflects learning from the trials given to other children. It will be recalled that the scores of Trial 1 are based on responses that may have been preceded by one through nine vicarious trials depending upon when a child was called upon. Unfortunately, the manner in which the present data were gathered does not allow

for an analysis on Trial 1 of the relationship between the number of preceding vicarious trials on a particular letter and the likelihood of success on that letter.

In general, the results of the study indicate that group instruction can expedite performance on a learning task. Closer examination of learning in the first training session in the group condition, however, will be needed to confirm the present hypothesis that higher performance under this condition results from more rapid learning by attending to trials given to others participating in the group.

The present findings have implications for the group versus individualized instruction debate in education. Education has many innovative ideas regarding instruction, but generally action is not guided by systematic research. This study provides evidence that group instruction facilitates performance and is a more efficient method of teaching, at least for the instruction of certain content, such as the teaching of letter sounds.

Further evidence of the utility of group instruction comes from a study conducted by Chun (see Technical Report #18). She found that homogeneous group instruction, amongst other factors, resulted in more Arithmetic problems completed than an individualized program.

An additional consideration is that group instruction allows for the occurrence of structured lessons which is unrealistic with individual learning, in which most of the 30 children in the class are at different levels of the curriculum.

However, little is known at present regarding the academic skills which lend themselves best to group instruction and regarding the degree of homogeneity and size of the group that results in effective group instruction. These variables influence, if not determine, the degree to which group

instructions are more effective in comparison to individualized instruction. For example, little benefit can be expected from group instruction, when the group members are at very different levels of ability or skill.

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